#014-WL001 Addendum for the West Lafayette Fire Department 2014 or Newer Bid Specs for a Fire Apparatus Pumper with CAFS.

Date: 7/9/14

The following matters regarding the Bid Specifications are addressed by this Addendum and should be addressed by all bidders in any bid submitted:

This addendum is for an optional Pump and CAFS system as opposed to the Hale QMAX, either or both may be bid as separate bids.

If any questions of said addendum, please contact Fire dept. by email at tschutter@westlafayette.in.gov,

The following specs pertain to the optional Darley pump and Darley CAFS system.

SINGLE STAGE FIRE PUMP (CAFS)

The pump shall be a Darley LDMBC single stage fire pump, capable of a 1500 gpm rating.

Power to drive the pump shall be provided by the same engine used to propel the apparatus. The pump shall be midship mounted and designed to operate through an integral transmission, including a means for power selectivity to the driving axle or to the fire pump.

The pump shall contain a cored heating jacket feature that, if selected, can be connected into the vehicle antifreeze system to protect the pump from freezing in cold climates.

The impeller shall be a high strength bronze alloy of mixed flow design, accurately balanced and splined to the pump shaft for precision fit and durability. The impeller shall feature a double suction inlet design with opposed volute cutwaters to minimize radial thrust.

The seal rings shall be renewable, double labyrinth, wrap around bronze type.

The pump shaft shall be precision ground stainless steel with long wearing titanium hard coating. The shaft shall be splined to receive broached impeller hubs, for greater resistance to wear, torsional vibration, and torque imposed by engine.

The bearings provided shall be heavy duty, deep groove, radial type ball bearings. They shall be oversized for extended life. The bearings shall be protected at all openings from road dirt and water splash with oil seals and water slingers.

The transmission case shall be heavy-duty cast iron alloy with adequate oil reserve capacity for low operating temperatures. The transmission case shall contain a magnetic drain plug for draining the gearcase oil and a dipstick for checking and filling the level of the gear case through its opening. The transmission shall also allow the use of an external heat exchanger for increased cooling under extreme conditions.

The pump driveshaft shall be precision ground, heat-treated alloy steel, with a minimum 2-1/2" x 10" splined ends. Gears shall be helical design, and shall be precision cut for quiet operation and extended life. The gears shall be cut from high strength alloy steel, heat-treated and gas nitrided. The gear face shall be 3-1/2" minimum.

The gearshift shall be a heat-treated alloy steel splined spur gear to engage either the pump drive gear or the truck drive shaft gear. The gear ratio of the pump shall be selected by the pump and apparatus manufacturer's Engineering Department.

Due to the advantages of the above gear and drive feature, chain drive and designs requiring additional lubrication are not acceptable.

A discharge manifold, as supplied as part of the pump by the pump manufacturer, shall include a discharge check valve assembly to allow priming of the pump from draft with discharges open and caps off.

Due to the importance of the above discharge manifold and check valve assembly, intended to be included with the overall pump design, there shall be no exception allowed to this requirement.

Discharge outlets shall have extensions with companion flange openings to allow ease of service. Two ports shall be provided on a pump panel for testing of vacuum and pressure readings. A weather resistant Performance Data Plate shall be installed on a pump panel.

The pump priming system, heat exchanger system, discharge and suction valves, relief valves, pump shift, and master drain shall be as detailed elsewhere in these specifications.

Two (2) manuals covering the fire pump, pump transmission, and selected options of the fire pump shall be provided with the apparatus.

CAFS COMPATIBLE

The pump transmission shall be designed to accommodate an integrated, air compressor mounting bracket. This bracket shall be installed to properly align a rotary screw air compressor with an external sprocket driven by the pump transmission. The air compressor shall be driven using a Gates "Poly Chain GT" belt drive system. The air compressor drive sprocket shall be supplied with an electric over air, multi plate, industrial clutch designed to be engaged at idle and allow disengagement at any rpm. The clutch shall incorporate an automatic, high CAFS oil temperature shut down to avoid damage to the rotary screw air compressor. An interlock shall be installed to disallow air compressor engagement if engine rpm is higher than recommended.

10-47-1200

DARLEY MECHANICAL SEAL

The fire pump shall be furnished with a Darley maintenance free mechanical seal; manufactured using the material silicon carbide (no exceptions). The mechanical seal shall be a non-contacting, non-wearing dual seal design. The lip seal shall eliminate leakage on a wet pump while parked on standby. The second seal shall allow a drip rate for cooling and lubrication while pumping.

10-90-1500

U.L. CERTIFICATION - 1500 GPM

The fire pump shall meet and perform the following tests to receive a U.L. Certification.

100% of rated capacity at 150 PSI net pump pressure

100% of rated capacity at 165 PSI net pump pressure

70% of rated capacity at 200 PSI net pump pressure

50% of rated capacity at 250 PSI net pump pressure

11-00-1200

PUMP SHIFT

One (1) air powered pump shift shall be installed in the cab. The shift shall engage the fire pump. The pump shift shall be engaged only when apparatus is in a stationary position and the parking brake is engaged. The following indicator lights shall be included with pump shift.

A green indicator light labeled "**PUMP ENGAGED**" shall indicate pump shift has successfully been completed.

A green indicator light labeled "**OK TO PUMP**", shall indicate the chassis transmission is in pump gear and parking brake is engaged.

10-44-3000

PUMP ANODES

The pump shall be supplied with two (2) anodes for corrosion protection. The anodes shall be mounted at a 3/4" tap location on the pump manifolds. One (1) anode shall be mounted on the suction side of the pump and one (1) anode on the discharge side of the pump.

10-48-5700

TRANSMISSION LOCK-UP DEVICE

The automatic chassis transmission shall be delivered to the body builder with high gear lock up device installed on the automatic transmission, to allow proper gear ratio for pump operation. The transmission shall be programmed by the chassis manufacturer to include this feature.

10-49-0100

DRIVELINE MODIFICATION

The chassis driveline shall be modified to accommodate any changes required by the installation of the fire pump.

11-00-0000

PUMP OPERATION DVD(s)

One (1) DVD(s) explaining proper fire pump operating procedures and maintenance for the fire pump shall be included upon delivery. The DVD(s) shall be produced and provided by the same company that manufactures the fire apparatus.

11-00-5250

AIR COMPRESSOR SHIFT (CAFS)

A CAFS air compressor shift shall be provided on the pump operator's panel to engage the CAFS air compressor (see Darley AutoCommander in the CAFS section of these specifications).

11-01-2010

ELECTRIC PRIMER

The fire pump priming system shall consist of one (1) 12V positive displacement type rotary vane primer. The primer shall be approved per NFPA 1901 recommendations. The primer shall include a lubrication fluid reservoir. The priming pump shall be constructed of heat treated aluminum and hard coat anodized.

A single, push-pull control shall be located on the pump operator's panel with a "Pull to Prime - Push To Close" label.

17-32-2250

PRIMER RESERVOIR LIGHT

A light shall be provided to illuminate the primer reservoir. The light shall be switched on the light itself.

11-01-2800

The pump priming system shall include a light to indicate when the pump priming system has been activated. The light shall be red in color and shall be labeled "WARNING - Primer Engaged".

17-64-5200

PRESSURE GOVERNOR

A Darley "***AUTO CONTROL***" electronic pressure governor and engine monitoring system shall be installed on the pump operators control panel. The governor shall be configured to operate with the chassis engine.

It shall regulate engine RPM to maintain a consistent pressure out of the water pump over a wide range of outgoing flows.

The unit shall operate in both RPM and PSI modes. The 6-1/2" x 7-1/2" control unit shall include the following features:

DISPLAY:

--A 4-digit LED readout for pump discharge pressure.

--A 4-digit LED readout for pump intake pressure.

--A 20 segment LED bar graph for the pressure or RPM setting.

--A 4-digit readout for engine RPMs.

--Three (3), 10 segment bar graphs for battery voltage, engine oil pressure, and engine temperature. The bar graph display shall flash if low voltage, low oil pressure, or high engine temperature condition occurs.

--"Throttle Ready" green LED. It shall indicate that the pump is engaged in the proper stationary pumping position, and that the parking brake is set.

FUNCTION SWITCHES:

Idle Mode - Preset - Increase - Decrease - Silence.

This system shall utilize information from the chassis engine ECU.

An audible alarm buzzer shall be included.

11-00-4400

INDICATOR LIGHT

A green indicator light labeled "**THROTTLE READY**" shall be included with the pressure governor control located on the pump operator's panel. It shall indicate that the pump is engaged in the proper stationary pumping position, and that the parking brake is set.

11-02-4000

INTAKE RELIEF VALVE

One (1) bronze, Elkhart intake relief valve shall be provided and mounted on the suction side of the pump, adjustable from 50-250 psi, on the valve itself. The valve shall be factory preset at approximately 125 psi. The system does not include an on/off control.

11-04-1000

HEAT EXCHANGER & HEATED PUMP CORE

An automatic heat exchanger system shall be provided in the pump. Antifreeze from the vehicle engine shall flow through the pump core jacket. Water flow from the fire pump shall be used to cool the engine antifreeze. This feature shall assist against the pump freezing in cold climates.

11-11-1000

MASTER DRAIN

One (1) rotary style master drain shall be installed on the lower portion of the side control panel. It shall be of brass construction and use a rotary screw mechanism against a rubber sealing surface. Each port shall be isolated. An "open and closed" label with arrows indicating direction shall be installed.

11-11-5000

1/4 TURN DRAINS

Each gated 1-1/2" or larger inlet and discharge shall have a quarter turn push pull drain valve installed. The drain valves shall be located along the bottom on each pump panel. Inlets & discharges shall be plumbed to each drain at the lowest point. Each drain shall be plumbed with low pressure hose to drain below the module and be directed away from the pump operator. Each drain valve shall have a push pull handle control with a recess color coded function label.

12-01-6050

SUCTION INLETS

12-03-7800

6" LEFT SIDE INLET WITH BUTTERFLY

One (1) 6" suction steamer inlet with male NH threads shall be provided, on the left side pump panel. The inlet shall have a removable screen. The inlet shall have a 6" electric butterfly valve with an automatic relief and electric control installed in the side suction sleeve casting, completely behind the panel. There shall be an exterior mounted manual backup to open the valve.

A switch with indicator lights shall be mounted on the operator's control panel. The relief valve shall be mounted on the intake side of butterfly valve and factory preset to 185 psi with a maximum pressure of 300 psi. The valve shall relieve excess pressure to atmosphere.

A green "open" indicator light and a red "closed" indicator light shall be provided.

There shall be no exception to the above requirements.

12-03-8400

6" RIGHT SIDE INLET WITH BUTTERFLY

One (1) 6" suction steamer inlet with male NH threads shall be provided, on the right side pump panel. The inlet shall have a removable screen. The inlet shall have a 6" electric butterfly valve with an automatic relief and electric control installed in the side suction sleeve casting, completely behind the panel. There shall be an exterior mounted manual backup to open the valve.

A switch with indicator lights shall be mounted on the operator's control panel. The relief valve shall be mounted on the intake side of butterfly valve and factory preset to 185 psi, with a maximum pressure of 300 psi. The valve shall relieve excess pressure to atmosphere.

A green "open" indicator light and a red "closed" indicator light shall be provided.

There shall be no exception to the above requirements.

DIRECT TANK AUTO FILL SYSTEM

One (1) automatic direct tank fill system shall be supplied and installed at the right side pump module with the 6" main intake.

The system shall operate refilling operations independently, without monitoring by the engineer. Refill operation shall not require apparatus or fire pump to be running. The system shall be capable of handling pressurized sources up to 300 psi. The system shall get an electronic signal from a Fire Research Vision Series water level gauge. The water level gauge supplies a programmed signal to stop filling when the tank level is at 85% full, and resume filling when the tank level reaches 50%. The valve system shall be able to be manually overridden in case of electric failure.

The controller shall have three toggle positions, with command signals to the fill valve:

1) Auto - Fully automates the water fill process, opens and closes the valve from signals sent by the water level gauge

2) Off - Closes the valve

3) Open - Opens the valve

The system shall enable the operator to perform the following control/operation functions and status indicators for the refill operation:

1) Provide toggle positions for Auto/Off/Open for control of electric refill valve

2) Solid green light advises the valve is open

3) Solid red light advises the valve is closed

The valves and actuator will be rated to the following specifications:

1) Totally sealed and waterproof to a NEMA 6P rating

2) CF8M body w/316 ball and stem

3) PTFE seats and stem packing

4) Compact Design

5) 3-piece Swing out style

6) Full Port valve waterway

7) Full Valve body rated to 1000 psi max

8) Manually over ride able

9) 1.5” valve - 170 GPM @ 1 CV

10) 2” Valve 376 gpm @ 1 CV

11) 2.5” Valve

Base System shall include the following components:

1) Operator control and placard with Weather-Pac connectors

2) Valve and electric actuator

3) All wiring harnesses and Weather-Pac connect

An installation and operation manual shall be provided, along with a one year limited warranty by the manufacturer.

NOTE: The valve control shall be a weatherproof toggle control mounted on the driver side pump operator's panel.

17-35-1000

PUMP PANEL ID PLATE

An identification plate, prepared by the fire pump manufacturer, shall be installed on the pump operator control panel to identify the fire pump serial number, model number, and performance.

17-35-1200

WARNING - PUMP OPERATOR

A warning plate shall be installed on the pump operator's panel, that states the following:

WARNING: Death or serious injury might occur if proper operating procedures are not followed. The pump operator as well as individuals connecting supply or discharge hoses to the apparatus must be familiar with water hydraulics hazards and component limitations.

11-10-2000

PLUMBING SYSTEM (STAINLESS/BRASS)

All auxiliary suction and discharge plumbing related fittings, waterways, and manifolds shall be fabricated with stainless steel pipe, brass or high pressure hose with stainless steel couplings. Galvanized components and/or iron pipe components are not acceptable.

Upon completion, the entire system shall be fully pressure tested.

The plumbing and valve arrangement shall be capable of delivering water to the pump at a minimum flow rate of 500 GPM while pumping at 150 psi pressure.

Each gated intake shall be equipped with a 3/4 inch bleeder valve located in close proximity to the intake. All intakes shall be provided with suitable closures (valves or caps) capable of withstanding 500 PSI.

When any 3" or larger intake or discharge is gated (except tank to pump valve), the valve shall have a mechanism to allow the valve to fully open or fully close no faster than 3 seconds.

Any 2-1/2" or larger discharge outlet, mounted 42" or higher from ground, which hose is to be connected, and which is not in a hose storage area, shall be supplied with a sweep elbow of at least 30 degrees.

All 1-1/2" and larger intakes and discharges shall be equipped with drains. All drain valves shall be operational without the operator having to get under the apparatus. All drains shall be detailed elsewhere in these specifications.

All discharges and intakes shall terminate with chrome NST adapters, with chrome caps and chains, unless detailed otherwise in these specifications.

12-07-0100

NO LEFT SIDE AUXILIARY INLET REQUIRED

There is not a left side auxiliary inlet required on this apparatus.

12-08-1000

2-1/2" SUCTION(S) - RIGHT SIDE (Darley)

One (1) 2-1/2" brass suction valve(s) shall be installed on the right pump panel with the valve body mounted behind the pump panel. The control handle(s) shall be the quarter turn ball type, of the fixed pivot design, and located alongside the suction valve.

The suction(s) shall terminate with a 2-1/2" female NST chrome inlet swivel, a chrome male plug, chain, and a brass inlet strainer.

The valve(s) shall be Darley brand with a polished stainless steel ball.

12-18-0500

TANK TO PUMP LINE (MANUAL)

One (1) 3" tank to pump line shall be provided for connection between the water tank and the fire pump. The valve shall be a 3" bronze, quarter turn ball type. The valve shall be manually controlled from the pump operator's panel.

12-19-2000

TANK TO PUMP CHECK VALVE

The Darley fire pump suction inlet manifold shall be provided with an integral tank to pump check valve. The check valve shall is designed to automatically open when drafting from an onboard water tank, and close if the pump suction receives water pressure from an outside source.

13-01-2000

2" TANK FILL

One (1) 2" pump to tank fill shall be provided with a 2" inline bronze valve. The valve shall be manually controlled and properly labeled at the pump operator's panel.

14-02-9202

220 CFM COMPRESSED AIR FOAM SYSTEM

The apparatus shall be equipped with the latest, high energy, automatic, compressed air foam system (AutoCAFS II).

Ratings: The fire pump and air compressor shall be sized to provide at least 220 CFM (cubic feet per minute) of compressed air while simultaneously flowing at least 440 GPM (gallons per minute) of water flow. The pressure of the system shall be set at 125 PSI for the duration of this test.

This rating is as outlined with the NFPA recommendation that the water pump shall discharge two gallons of water for every one CFM of compressed air discharge. Fire pumps with UL ratings in excess of 1000 GPM commonly flow near capacity while simultaneously operating the air compressor at full output.

Components: The air compressor shall be a high quality, industrial rated, modulating, continuous duty, and of rotary screw design. The air compressor shall be mechanically driven by the main pump and shall be so designed as to provide optimum performance at 70% of rated engine RPM. Air compressor drive train shall provide a means to engage and disengage the air compressor as required.

The air compressor system shall include a pressurized oil lubrication system, oil reservoir with receiver/separator elements, oil filter, inlet air filter, and modulating air inlet control. The air compressor shall be provided with a pressure control system to automatically balance air pressure to water pressure. The air compressor air inlet valve shall open and close to provide the air flow desired while maintaining the air system pressure to water pump pressure to within 5 PSI differential. This balancing system is essential for safe operation of a compressed air foam system.

The air compressor lubrication system shall require cooling water to be supplied from the fire pump through a heat exchanger to cool the air compressor oil. The essential water flow to this oil cooler shall be supplied using a self-cleaning, flushed strainer system to ensure a consistent flow of cooling water. The oil temperature shall be thermostatically controlled to remain at a consistent operating temperature within the range from 170° F to 190° F.

AUTO CAFS COMMANDER

Panel Mounted Controls: The air compressor system shall have mounted on the operators control panel an "AutoCAFS Commander" electronic control used to engage and disengage the AutoCAFS air compressor. It includes an On/Off button with engagement light as well as the following features.

Additional Features

-Digital Air Pressure Gauge

-Mode button to switch between RPM readout, Hourmeter, and optional Air flow meter.

-Digital Air Compressor Oil Temperature Reading

-Programmable Engagement Speed Protection

-Automatic Blow Down Pressure Protection

-Programmable OverSpeed Warning with light and flashing message in Info Center

-Programmable High Speed Automatic Disengagement System

-Programmable Over Heat Warning

-Programmable High Temperature Automatic Disengagement System

-Optional "AutoOn" setting. Allows automatic engagement of the AutoCAFS air compressor any time the pump is placed into gear and operated. This feature can be used to eliminate two (2) steps when operating a CAFS when used in conjunction with the FoamPro "AutoOn" feature in the foam proportioner.

CAFS AIR INJECTION - AUTOMATIC

The AutoCAFS II shall utilize automatic air flow switch controls to inject the proper volume of compressed air into the foam discharges. A panel mounted toggle switch control shall automatically regulate the precise amount of compressed air independently into each compressed air foam system discharge of 2" plumbing or less. The air flow amount shall be factory preset to the proper levels. Each foam discharge shall include a manually adjustable valve mounted inside the pump compartment for fine tuning when desired.

The automatic control shall consist of a weatherproof toggle switch which electrically activates an air flow valve sized according to the SCFM requirement of the discharge. Each automatic air flow injection switch, mounted on the panel, shall be installed using a red protective switch cover. Each CAFS air injection switch shall be appropriately labeled.

AIR OUTLETS 1/4" CAFS SUPPLY

There shall be brass 1/4" female air hose quick-disconnect fittings mounted on each side pump panel. A bulkhead fitting with a removable coupling shall be mounted to the panel to allow for panel serviceability. The fittings shall be connected to the apparatus CAFS air compressor discharge outlet using 3/8" red flexible hose. There shall be an adjustable regulator installed on the discharge side of the air compressor separator to provide clean oil free compressed air to the side panels. Two (2) male quick disconnect fittings shall also be supplied.

STANDARD FOAM SUPPLY VALVE

The foam system shall be installed with a 3-way foam system supply valve. This 3/4" valve functions as a multipurpose valve control. In the standard position, the valve provides foam supplied from the foam tank to the foam proportioner. In the next position, the valve provides a drain using a short rubber hose connected to this valve. In the final position, the valve provides an "Off" position to allow for cleaning of the inline foam concentrate strainer. In this final position, the drain hose can also be utilized as an overboard secondary foam pickup hose.

This alternate source to the foam proportioner shall be provided near the inlet to the foam pump using a 3/4" three way valve to disconnect foam flow from the tank and allow foam to be drawn from a pail or other source through a 3/4" inside diameter yellow hose approximately four feet long. This hose shall be provided near the pump panel on the side of the truck and is intended to work best with the pail of foam concentrate setting on the running board.

This compressed air foam system shall include an air pressure gauge for use with CAFS.

Each of the components of this Automatic Compressed Air Foam System - (air compressor, drive system, foam proportioner, control and instrumentation system) shall be sized, driven, and installed to produce a well operating and reliable CAFS unit.

This (AutoCAFS II) compressed air foam system shall be completely assembled and tested by the fire pump manufacturing facility before delivery. The system shall then be installed by the fire apparatus manufacturer and retested for complete NFPA compliancy.

FOAM OUTLETS

The compressed air foam system shall be plumbed to provide both foam solution and compressed air to the specified discharges. Detailed descriptions of these discharges shall be provided elsewhere in these specifications.

14-14-2500

CAFS IN SERVICE REQUIREMENTS

The Darley Company is the leader in compressed air foam technology. Darley has CAFS systems throughout the United States and around the globe, operating successfully and effectively.

A listing of CAFS customers names with addresses, phone numbers, contact persons, and in service dates is available upon request.

14-14-2800

CAFS TESTING - DEMONSTRATION - MANUALS

Every Darley compressed air foam system is tested prior to delivery. After testing is completed, the foam system is flushed. Demonstration for proper operation and maintenance will be provided for the Purchaser's designated personnel (3-days of hands on training) at the purchasing Fire Dept. agreed upon location. Two (2) manuals for the CAFS pumping system are provided upon delivery.

14-20-3000

FOAM SYSTEM (2002 system)

A FoamPro 2002 Class A automatic, electronic, direct injection, foam proportioning system will be installed on the discharge side of the pump. It will provide foam to predetermined foam discharge(s). This foam system is completely automatic and requires only one push button to turn it on before the system is functioning.

The system will incorporate a paddle wheel flow meter to measure the water flow, and based on the foam percentage selected at the controller the direct injection pump will inject the proper amount of foam into the foam discharge(s).

The system is capable of providing precise foam solution concentration rates from 0.1% to 6%, and is operator adjustable with the push button digital display control.

System Capacity - Foam Pump is capable of up to 5 gpm of foam output @ 175 psi. Pump motor is 3/4 HP 12 volt.

Foam Concentration.....Water Flow Range

0.1%.....20-5000 gpm

0.2%.....20-2500 gpm

0.3%.....20-1666 gpm

0.5%.....20-1000 gpm

1.0%.....20-500 gpm

3.0%.....20-166 gpm

6.0%.....20-83 gpm

A check valve shall be installed between the flowmeter and the injection fitting to avoid foam contamination back into the rest of the pump.

System Features: Four (4) selectable modes for operator information:

1) Flow mode: Displays the total amount of water being flowed out of the foam discharge(s). Foam system need not be enabled to function in this mode.

2) Total Water mode: When selected shows the total amount of water flowed out of the foam discharge(s) since the unit was in operation.

3) Foam Percentage % mode: When selected shows the percentage rate that foam is being injected at if the system was turned on. This percentage can be changed by pressing the up or down arrow buttons at the bottom of the display.

4) Total Foam mode: When selected shows the total amount of foam that has been injected since the unit was turned on.

System will be provided with a low foam tank level switch which will alert operator of low foam concentrate level and will automatically shut unit off after two minutes.

Foam system flushing is achieved by simply turning off the unit and flowing water out of the discharge(s) that were previously flowing foam solution.

System will be completely installed inside pump compartment, with digital control unit and instruction plate mounted on the pump operators panel and will be calibrated, and tested before delivery.